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around Worcester, Mass., and, about the same time, in Pittsfield.

These sporadic and easily traceable migrations of the cotton worm moth, in the opinion of the writer, afford a rare opportunity, with the cooperation of many observers, for a thorough investigation into the causes of insect dispersal. Such an investigation would be likely to bring to light some important facts, of common interest to students of evolution and of economic entomology.

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SCIENTIFIC BOOKS

Sugar Analysis: For Cane-sugar and Beet-sugar Houses, Refineries and Experiment Stations and as a Handbook of Instruction in Schools of Chemical Technology. By FERDINAND G. WIECHMANN, Ph.D. New York, Jno. Wiley & Sons. Third edition. 8vo. Pp. xiii + 307. 7 figs. Cloth, \$3.00.

The author "has endeavored to cast his material in a form in which it would prove most readily available in the several branches of the sugar industry," and has reduced repetition to a minimum. "The methods and means used in the analysis of sugar and in the analysis of materials used in sugar production, have first been fully discussed, and then specific analytical control of cane-sugar manufacture, of beet-sugar manufacture, and of refining, has been taken up for detailed consideration."

The first seven chapters are devoted to Properties of Sucrose; Instruments Used in Sugar Laboratories; Polariscopes and Accessories; Sucrose Determination by Optical Analysis; Sucrose Determination by Chemical Analysis; Sucrose Determination by Optical and Chemical Analysis; and, Constituents of Sugar Other Than Sucrose; the eighth chapter to Materials Used in the Sugar Industry, the ninth, tenth and eleventh chapters, respectively, to Analytical Control in Cane-sugar Manufacture; Analytical Control in Beet-sugar Manufacture; and, Analytical Control in Refineries. In the twelfth chapter, a Résumé of the Work of the International

Commission for Uniform Methods of Sugar Analysis is given. Twenty well-selected sugar tables and the index to the volume occupy the last 70 pages.

The portions dealing with the properties of sucrose, instruments, polariscope and accessories, sucrose determination by optical methods, by chemical methods, by optical and chemical methods, and the constituents of sugar other than sucrose, are clear in definition without being overburdened with detailed description to be found in references cited. In some instances, however, more detailed directions would add value to the volume when being used for instructional purposes. For example, on page 123, in the direction for the determination of woody fiber, no precaution, such as covering the beaker with washed muslin, etc., is directed to prevent loss of portions of fiber in decanting, other than: "The water . . . is decanted carefully, in order to avoid any loss of the weighed sample."

On pages 71 and 178-179, in giving the method of Clerget, the author states that the use of subacetate of lead as a clarifying agent is not permissible, recommending, on page 71, specially prepared blood-carbon, and on pages 178-179 specially prepared bone-black, "if a decolorant must be used."

Some of the methods given in chapter 8, for the analysis of materials used in the sugar industry, could be substituted by more modern and expedient ones. That given on page 146, for the determination of calcium sulphide, could be substituted by the more expedient evolution method used in the steel and iron industry. On page 151, seventh line from the top, in the method for the determination of total phosphoric acid in phosphate paste, the direction, after making alkaline with ammonia and clearing with nitric acid, is: "Add about 10 grams of ammonium nitrate." This is neither necessary nor advisable, when the method of solution is that recommended at the top of the same page, viz., by nitric and hydrochloric acids. The rest of the method, as outlined on this page, could be substituted by that of the Association of Official Agricultural Chemists as given in Bulletin 107, Bureau of Chemistry. On page 153,

"the latent heat of steam formation" is given as 967, instead of 970.4. On page 154, the method given for the determination of moisture and volatile carbon in coal could be replaced by standard ones. On page 155, the author states that, from the data of the proximate analysis, "the calorific power of the coal can be *approximately* calculated by Lenoir's formula" which he gives. A description and instruction in the use of a standard calorimeter at this point would not be amiss. On page 158, under "Water," the direction is to dry total solids and the residue, before driving off organic and volatile matter, at 130 degrees Centigrade to constant weight, instead of at 103 degrees for one half hour. On page 162, the soap method for hardness is given, but no mention is made of the titration methods.

In the chapters on analytical control in cane-sugar factories, beet-sugar factories and refineries, the author tabulates the work involving control of sugar materials and products, indicating what determinations are necessary on each. He avoids repetition as much as possible by referring to the directions for analytical methods given in the chapters devoted to outlines and discussions. One would call attention to the direction for determination of sucrose in molasses, on page 181. Under Clerget, on this page the following is given: "The direct polarization and the polarization after inversion should be carried out on portions of one and the same solution; for this reason two or three times the normal weight of molasses should be dissolved in 500 c.c. of water. The determination is then carried out as previously directed." Doubtless he intends that the dilution should be to 500 c.c. instead of "dissolved in." Since in giving the method of Clerget on pages 71 and 178-179, it is stated that the use of subacetate of lead is not permissible, but if a decolorant must be used specially prepared blood-carbon or bone-black should be employed, the operator or student would refer to these directions when preparing his solution for the double polarization of molasses, thereby omitting clarification with lead compounds and subsequent delead-ing but resorting to decolorization with bone-

black or blood-carbon, unless he perchance referred to the Meissel-Hertzfeld method as given in chapter 6, page 94, which he is hardly expected to do since this method is given and discussed in the chapter given to the determination of sucrose by optical and chemical methods and not to the determination by optical methods as Clerget calls for. Evidently the author would not recommend clarification of molasses with subacetate of lead when determining sucrose by the Clerget method.

Chapter 12 is an invaluable addition to the volume, as a résumé of the work of the International Commission is here given, which is not always at the hands of the chemist, either in the original transactions or in compilation. It is commendable that this so-important work is compiled and condensed in an available form.

The tables given are well selected and will meet the needs of the sugar analyst, except table 18 (that used in calculating the percentage of commercial sugar recovered from the sucrose in the massecuite as given by I. H. Morse), which is incomplete and would be of little service except in refineries.

The subject-matter of the volume is well correlated, repetitions are few, and the style and appearance of the book are good. Although criticism is here brought of some of the methods of analysis, as given in chapter 8, and attention called to the method for the preparation of the solutions in the determination of sucrose in molasses, and to the incompleteness of table 18, this work will be an addition to any technical library and of aid to the analyst experimenter and student, when working on commercial sugars and allied products and following routine analytical work in sugar houses and refineries.

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Electric Arc Phenomena. By EWALD RASCH. Translated from the German by K. TORNBERG. New York, D. Van Nostrand Company. 1913. Pp. 194.

The introduction contains a discussion of the relative merits of the electromagnetic and